



# UNIGRAND BM7301

## Bluetooth HID Module

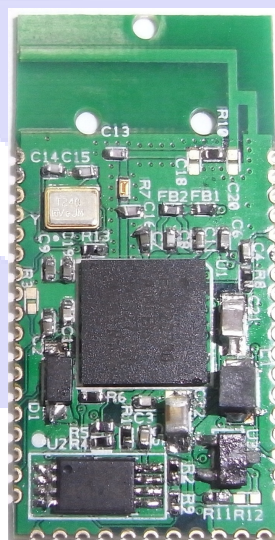
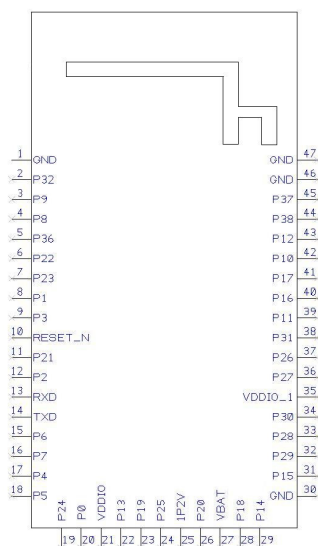
### KEY FEATURES

- Bluetooth 3.0
- Power Level Class 2 (Max 4dBm)
- Internal Antenna
- BQB qualified
- Pin-Compatible to the standard legacy BCM2042 module

### APPLICATIONS

- Bluetooth HID Applications
- Bluetooth Keyboard
- Bluetooth Mouse
- Game Controllers

### PIN ASSIGNMENT



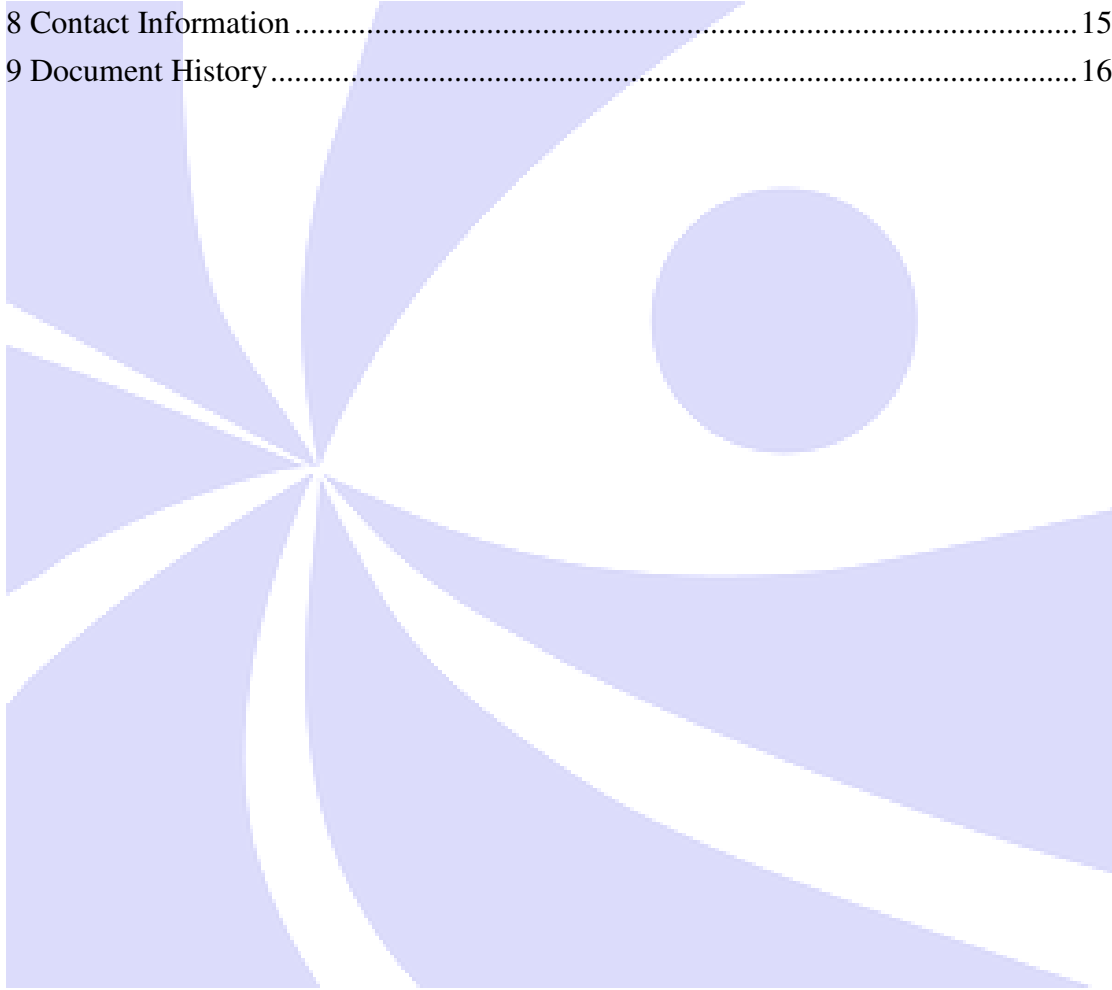
TOP VIEW

PHYSICAL SIZE 30.7 mm X 15.2 mm



## CONTENTS

1 General Description .....	3
2 Hardware Pad Functions .....	4
3 PCB Footprint .....	9
4 Hardware Block Diagram .....	10
5 Electrical Characteristics .....	11
6 Radio Characteristics .....	12
7 Applications .....	14
8 Contact Information .....	15
9 Document History .....	16





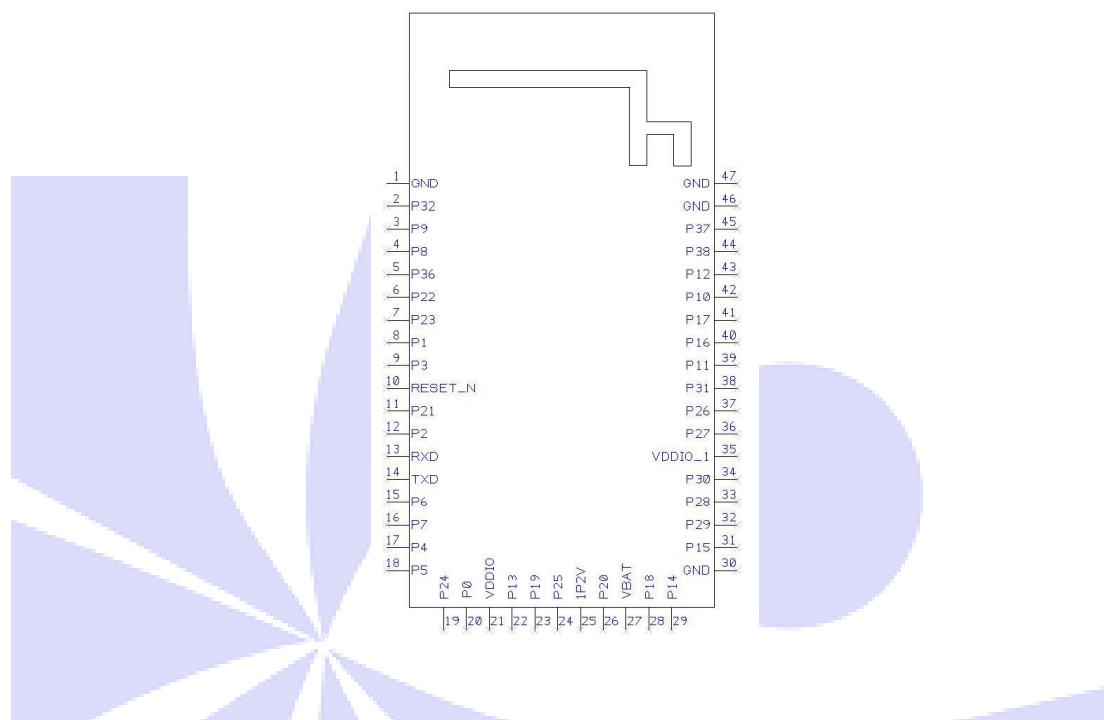
## 1 General Description

**B**M7301 is an highly integrated Bluetooth module for wireless HID devices. BM7301 uses Broadcom 20730 as the major Bluetooth chip. It supports the HID profile. With on-chip support for various sensors, it eliminates external processor.

The BCM20730 radio has been designed to provide low power, low cost, and robust communications for application operating in the globally available 2.4GHz unlicensed ISM band. It is fully compliant with Bluetooth Radio Specification 3.0. The device is ideal for applications in wireless input devices including keyboards, mice, joysticks, and game controllers. Built-in firmware adheres to the Bluetooth Human Interface Device Interface.



## 2 Hardware Pad Functions



Pad Definition	Pad and Number	Pad Type	Description
VCC1.2	1P2V 25	VCC Power 1.2V	Power output PAD
GND	GND 1 GND 30 GND 46 GND 47	Ground	Ground connections
VCC3.0	VDDIO 21 VDDIO_1 35	VCC Power 3.0 V	Power output PAD
GPIO: P0	P0 20	GPIO	GPIO: P0 Keyboard scan input (row): KSIO A/D converter input Peripheral UART: quart_tx SPI_2: MOSI (master and slave) IR_RX



GPIO: P1	P1 8	GPIO	GPIO: P1 Keyboard scan input (row): KSI1 A/D converter input Peripheral UART: puart_rts SPI_2: MISO (master and slave) IR_TX
GPIO: P2	P2 12	GPIO	GPIO: P2 Keyboard scan input (row): KSI2 Quadrature: QDX0 Peripheral UART: puart_rx Triac control 2 SPI_2: SPI_CS (slave only) SPI_2: SPI_MOSI (master only)
GPIO: P3	P3 9	GPIO	GPIO: P3 Keyboard scan input (row): KSI3 Quadrature: QDX1 Peripheral UART: puart_cts SPI_2: SPI_CLK (master and slave)
GPIO: P4	P4 17	GPIO	GPIO: P4 Keyboard scan input (row): KSI4 Quadrature: QDY0 Peripheral UART: puart_rx SPI_2: MOSI (master and slave) IR_TX
GPIO: P5	P5 18	GPIO	GPIO: P5 Keyboard scan input (row): KSI5 Quadrature: QDY1 Peripheral UART: puart_tx SPI_2: MISO (master and slave)
GPIO: P6	P6 15	GPIO	GPIO: P6 Keyboard scan input (row): KSI6 Quadrature: QDZ0 Peripheral UART: puart_rts SPI_2: SPI_CS (slave only) Triac control 1
GPIO: P7	P7 16	GPIO	GPIO: P7 Keyboard scan input (row): KSI7 Quadrature: QDZ1 Peripheral UART: puart_cts SPI_2: SPI_CLK (master and slave)
GPIO: P8	P8 4	GPIO	GPIO: P8 Keyboard scan output (column): KSO0 A/D converter input External T/R switch control: ~tx_pd



GPIO: P9	P9 3	GPIO	GPIO: P9 Keyboard scan output (column): KSO1 A/D converter input External T/R switch control: tx_pd
GPIO: P10	P10 42	GPIO	GPIO: P10 Keyboard scan output (column): KSO2 A/D converter input
GPIO: P11	P11 39	GPIO	GPIO: P11 Keyboard scan output (column): KSO3 A/D converter input
GPIO: P12	P12 43	GPIO	GPIO: P12 Keyboard scan output (column): KSO4 A/D converter input
GPIO: P13	P13 22	GPIO	GPIO: P13 Keyboard scan output (column): KSO5 A/D converter input Triac control 3
GPIO: P14	P14 29	GPIO	GPIO: P14 Keyboard scan output (column): KSO6 A/D converter input Triac control 4
GPIO: P15	P15 31	GPIO	GPIO: P15 Keyboard scan output (column): KSO7 A/D converter input IR_RX
GPIO: P16	P16 40	GPIO	GPIO: P16 Keyboard scan output (column): KSO8
GPIO: P17	P17 41	GPIO	GPIO: P17 Keyboard scan output (column): KSO9 A/D converter input
GPIO: P18	P18 28	GPIO	GPIO: P18 Keyboard scan output (column): KSO10 A/D converter input
GPIO: P19	P19 23	GPIO	GPIO: P19 Keyboard scan output (column): KSO11 A/D converter input
GPIO: P20	P20 26	GPIO	GPIO: P20 Keyboard scan output (column): KSO12 A/D converter input
GPIO: P21	P21 11	GPIO	GPIO: P21 Keyboard scan output (column): KSO13 A/D converter input Triac control 3



GPIO: P22	P22 6	GPIO	GPIO: P22 Keyboard scan output (column): KSO14 A/D converter input Triac control 4
GPIO: P23	P23 7	GPIO	GPIO: P23 Keyboard scan output (column): KSO15 A/D converter input
GPIO: P24	P24 19	GPIO	GPIO: P24 Keyboard input output (column): KSO16 SPI_2: SPI_CLK (master and slave) SPI_1: MISO (master only) Peripheral UART: uart_tx
GPIO: P25	P25 24	GPIO	GPIO: P25 Keyboard scan output (column): KSO17 SPI_2: MISO (master and slave) Peripheral UART: uart_rx
GPIO: P26	P26 37	GPIO	GPIO: P26 Keyboard scan output (column): KSO18 SPI_2: SPI_CS (slave only) SPI_1: MISO (master only) Optical control output: QOC0 Triac control 1
GPIO: P27	P27 36	GPIO	GPIO: P27 Keyboard scan output (column): KSO19 SPI_2: MOSI (master and slave) Optical control output: QOC1 Triac control 2
GPIO: P28	P28 33	GPIO	GPIO: P28 Optical control output: QOC2 A/D convert input LED1 IR_TX
GPIO: P29	P29 32	GPIO	GPIO: P29 Optical control output: QOC3 A/D converter input LED2 IR_RX
GPIO: P30	P30 34	GPIO	GPIO: P30 A/D converter input Pairing button pin in default FW Peripheral UART: uart_rts
GPIO: P31	P31 38	GPIO	GPIO: P31 A/D converter input EEPROM WP pin in default FW Peripheral UART: uart_tx

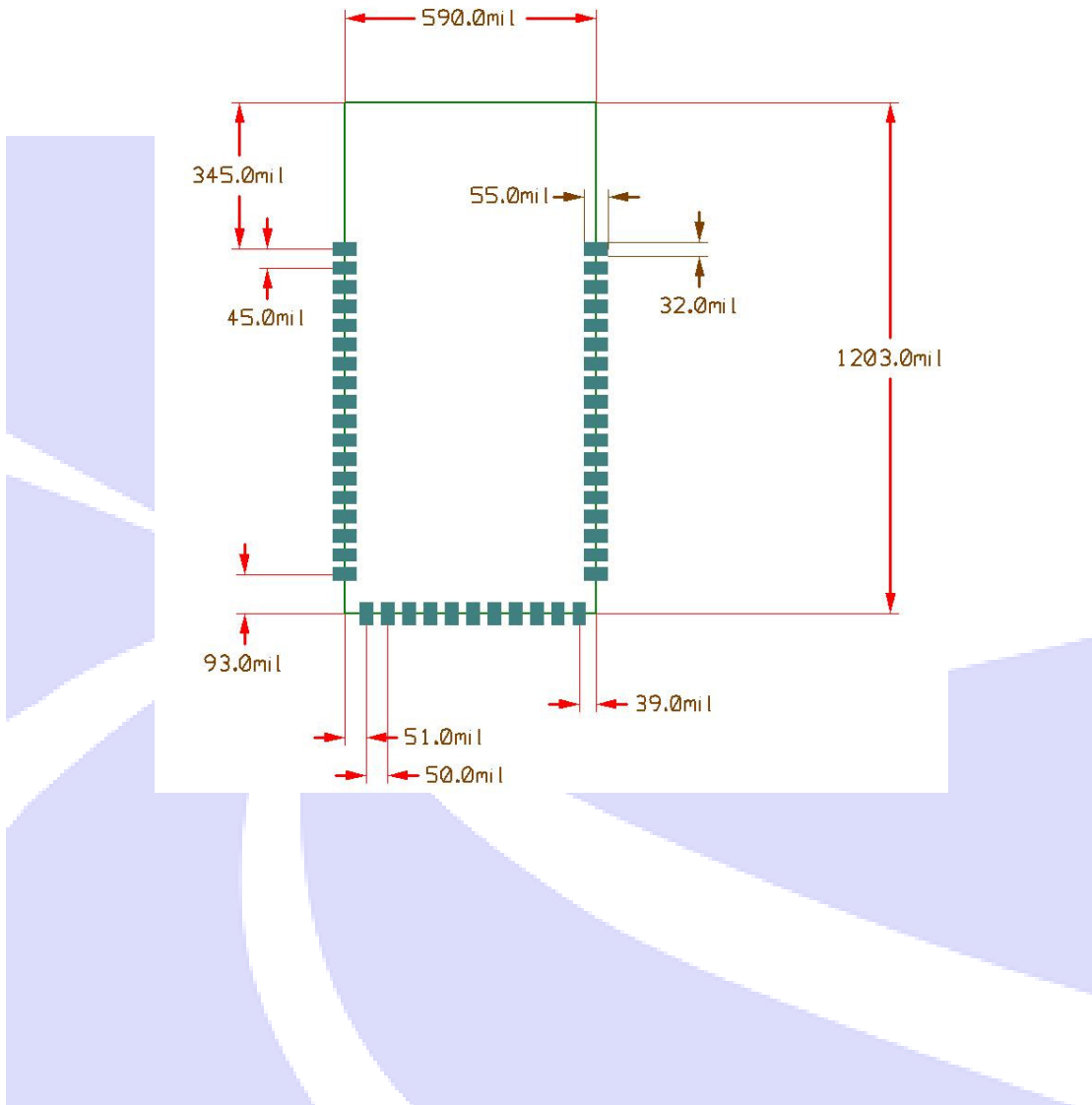


GPIO: P32	P32 <b>2</b>	GPIO	GPIO: P32 A/D converter input Quadrature: QDX0 SPI_2: SPI_CS (slave only) SPI_1: MISO (master only) Auxiliary clock output: ACLK0 Peripheral UART: puart_tx
GPIO: P36	P36 <b>5</b>	GPIO	GPIO: P36 A/D converter input Quadrature: QDZ0 SPI_2: SPI_CLK (master and slave) Auxiliary Clock Output: ACLK0 Battery detect pin in default FW External T/R switch control: ~tx_pd
GPIO: P37	P37 <b>45</b>	GPIO	GPIO: P37 A/D converter input Quadrature: QDZ1 SPI_2: MISO (slave only) Auxiliary clock output: ACLK1
GPIO: P38	P38 <b>44</b>	GPIO	GPIO: P38 A/D converter input SPI_2: MOSI (master and slave) IR_TX XTALO32K
Battery Input	VBATT <b>27</b>	BATTERY	Battery cell positive terminal
Reset	nRESET <b>10</b>	RESET	Active-low system reset with open-drain output & internal pull-up resistor
uP_TX	TX <b>14</b>	UART TX	UART serial output – Serial data output for the HCI UART interface. Leave unconnected if not used.
uP_RX	RX <b>13</b>	UART RX	UART serial input – Serial data input for the HCI UART interface. Leave unconnected if not used.



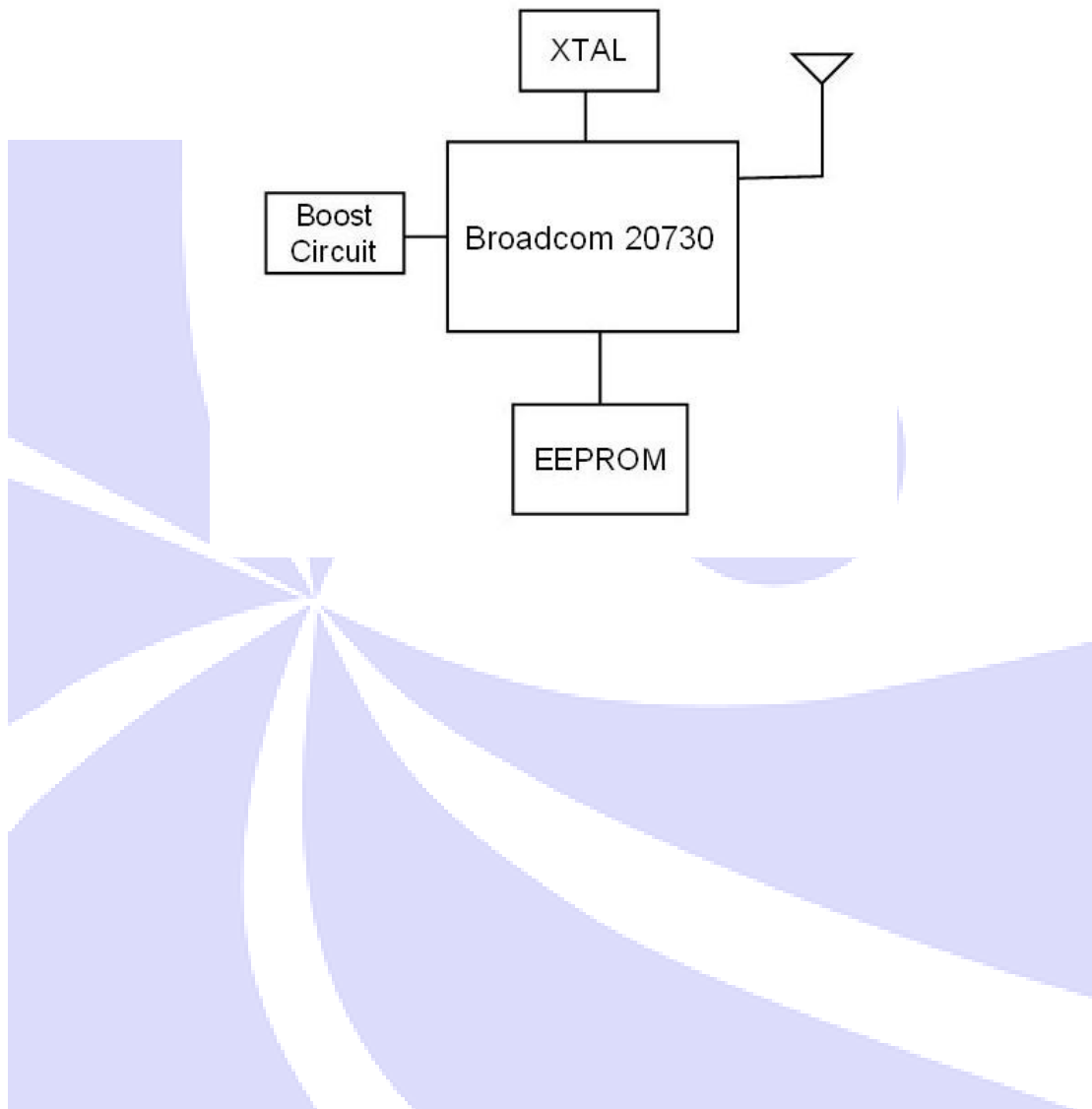


### 3 PCB Footprint





## 4 Hardware Block Diagram





## 5 Electrical Characteristics

Maximum Electrical Rating		
Rating	Value	Unit
DC supply voltage for RF	1.26	V
DC supply voltage for Core	1.26	V
DC supply voltage for I/O	3.6	V
Voltage on input or output pin	VSS-0.3 to VDD+0.3	V
Storage temperature range	-40 to 125	°C



## 6 Radio Characteristics

### Receiver RF Specifications

Parameter	Mode and Conditions	Min	Typ	Max	Unit
<b>Receiver Section</b>					
Frequency range	-	2402	-	2480	MHz
RX sensitivity (standard)	GFSK, 0.1%BER, 1Mbps	-	-88.0	-84.0	dBm
Rx sensitivity (low current)		-	-84.0	-	dBm
Input IP3	-	-16			dBm
Maximum input		-10	-	-	dBm
<b>Interference Performance</b>					
C/I cochannel	GFSK, 0.1%BER <sup>a</sup>	-	-	11.0	dB
C/I 1MHz adjacent channel	GFSK, 0.1%BER <sup>a</sup>	-	-	0.0	dB
C/I 2MHz adjacent channel	GFSK, 0.1%BER <sup>a</sup>	-	-	-30.0	dB
C/I $\geq$ 3MHz adjacent channel	GFSK, 0.1%BER <sup>a</sup>	-	-	-40.0	dB
C/I image channel	GFSK, 0.1%BER <sup>a</sup>	-	-	-9.0	dB
C/I 1MHz adjacent to image channel	GFSK, 0.1%BER <sup>a</sup>	-	-	-20.0	dB
<b>Out-of-Band Block Performance (CW)<sup>b</sup></b>					
30MHz to 2000 MHz	0.1%BER	-	-10.0	-	dBm
2000MHz to 2399MHz	0.1%BER	-	-27	-	dBm
2498MHz to 3000MHz	0.1%BER	-	-10.0	-	dBm
<b>Spurious Emissions</b>					
30MHz to 1GHz	-	-	-	-57.0	dBm
1GHz to 12.75GHz	-	-	-	-55.0	dBm

a. Desired signal is 10 dB above the reference sensitivity level (defined as -70dBm).

b. Desired signal is 3dB above the reference sensitivity level (defined as -70 dBm).



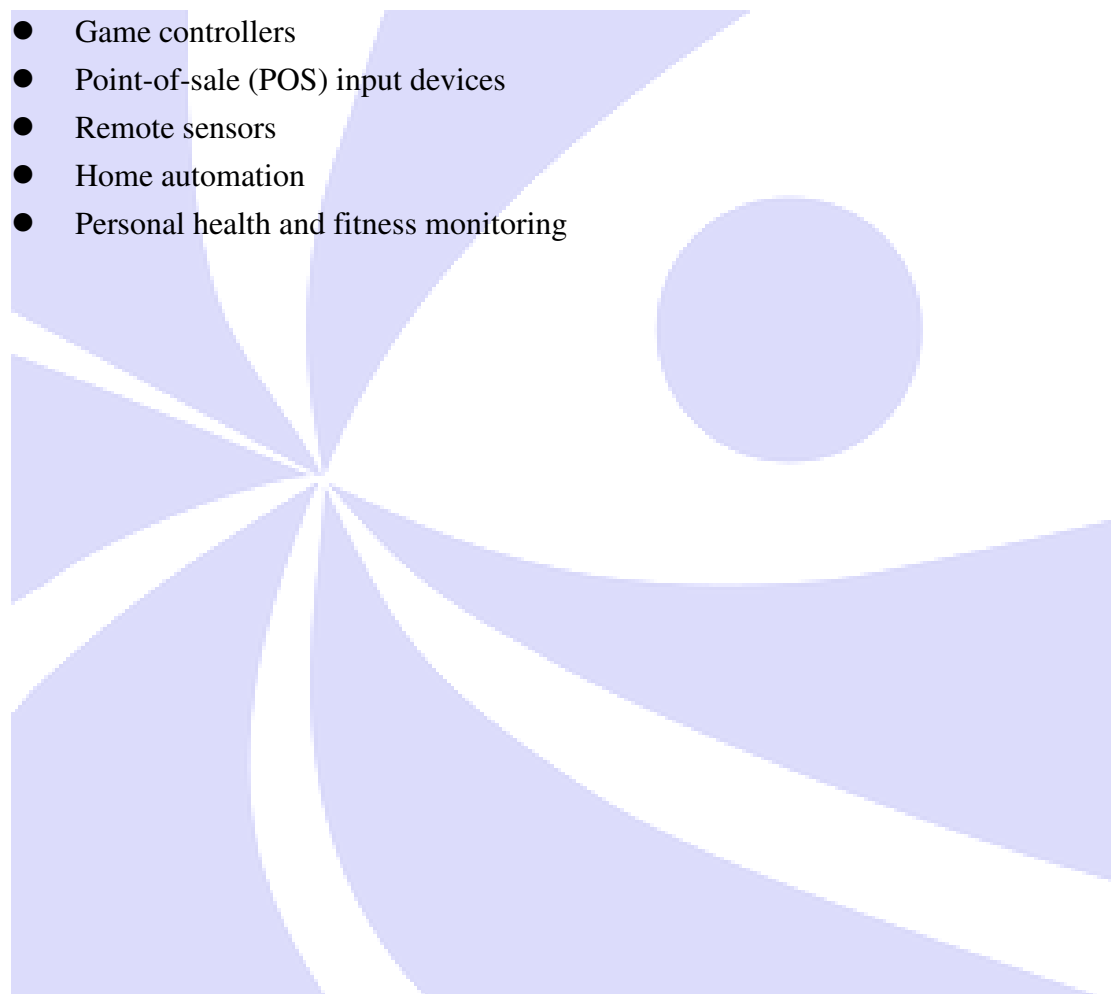
**Transmitter RF Specifications**

Parameter	Min	Typ	Max	Unit
<b>Transmitter Section</b>				
Frequency range	2402	-	2480	MHz
Output power adjustment range	-6.0	-	4.0	dBm
Default output power	-	4.0	-	dBm
Output power variation	-	2.0	-	dB
20 dB bandwidth	-	900	1000	kHz
<b>Adjacent Channel Power</b>				
$ M - N  = 2$	-	-	-20	dBm
$ M - N  \geq 3$	-	-	-40	dBm
Out-of-Band Spurious Emission				
30MHz to 1GHz	-	-	-36.0	dBm
1GHz to 12.75GHz	-	-	-30.0	dBm
1.8GHz to 1.9GHz	-	-	-47.0	dBm
5.15GHz to 5.3GHz	-	-	-47.0	dBm
<b>LO Performance</b>				
Initial carrier frequency tolerance	-	-	$\pm 75$	kHz
Frequency Drift				
DH1 packet	-	-	$\pm 25$	kHz
DH3 packet	-	-	$\pm 40$	kHz
DH5 packet	-	-	$\pm 40$	kHz
Drift rate	-	-	20	kHz/50us
<b>Frequency Deviation</b>				
Average deviation in payload (sequence used is 00001111)	140	-	175	kHz
Maximum deviation in payload (sequence used is 10101010)	115	-	-	kHz
Channel spacing	-	1	-	MHz



## 7 Applications

- Wireless pointing device: mice, trackballs, gestural controls
- Wireless keyboards
- 3D glasses
- Remote controls
- Game controllers
- Point-of-sale (POS) input devices
- Remote sensors
- Home automation
- Personal health and fitness monitoring





## 8 Contact Information

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## 9 Document History

Date	Revision	Reason of Change
15 Dec 2011	a	First Release

# UNIGRAND BM7301

## Datasheet

### BM7301-datasheet-a

